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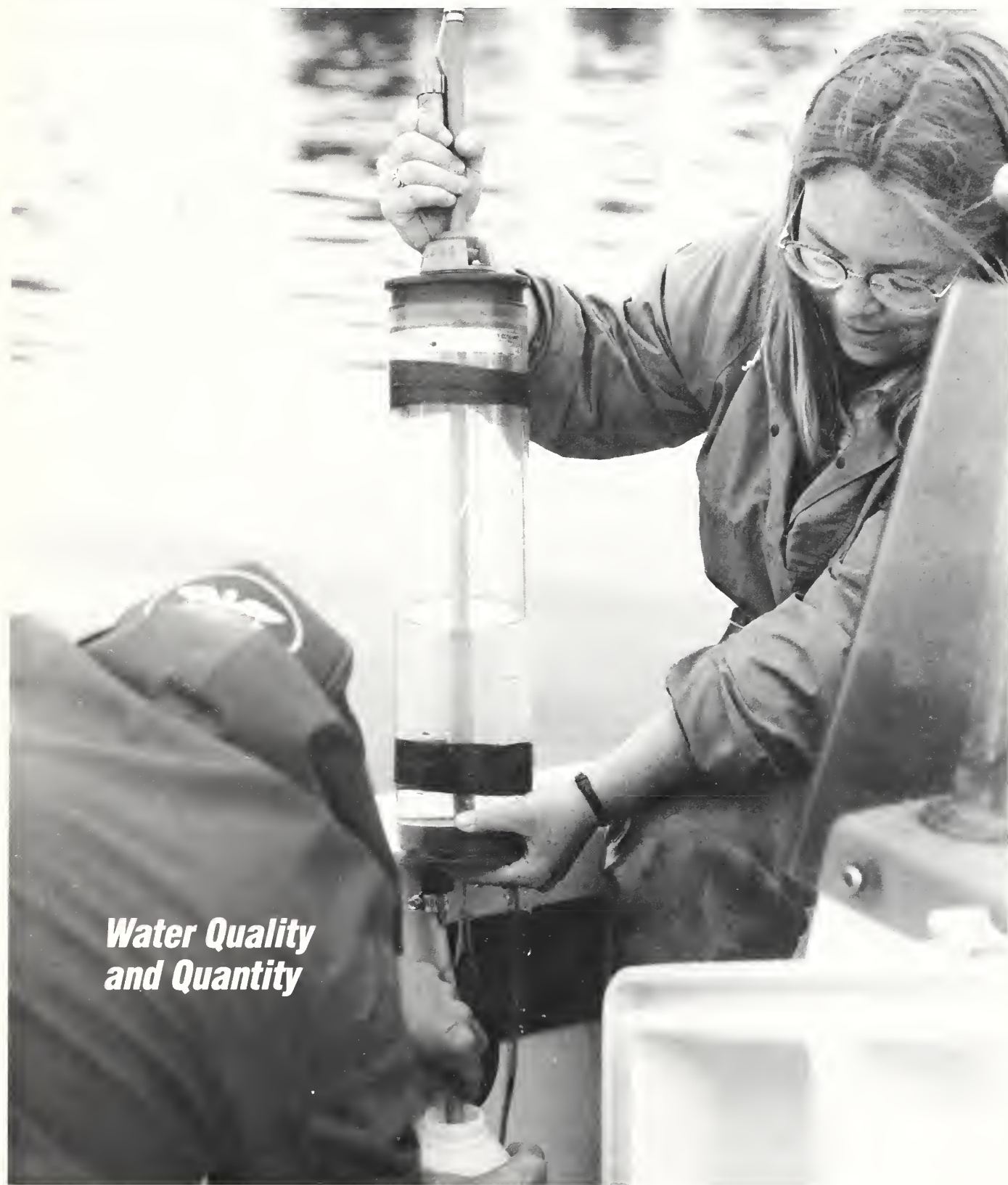
and **Soil Water Conservation**

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***Water Quality
and Quantity***

Cover: Debra Lester, water resources research assistant at the University of Vermont, helps SCS District Conservationist Jim Monahan get water samples from St. Albans Bay, Vt. The water samples are part of the monitoring process for the St. Albans Bay Rural Clean Water Program. (Photo by Paul Barker.)

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Comments from the SCS Chief:

Conservation Partnership for Clean Water

FARMERS AND RANCHERS have a vested interest in keeping their natural resources healthy — their very lives depend on it — so they continue to be the most concerned citizens this Nation has when it comes to water quality and quantity. They know that agriculture must assume responsibility for prudent management of soil, irrigation water, agri-chemicals, and animal waste. But making those management decisions alone can be hard in the high-risk business of agriculture. That's why I want folks in production agriculture to know that they can turn to SCS and their local conservation district as partners for help and advice.

SCS's job in this partnership is threefold:

- *Offer the landowner reasonable alternatives for solving water resource problems.* Our job is to offer practical options, including a choice of what we call "best management systems" for water quality, and to let the landowners make their own decisions. Helping them to put on the ground voluntarily something we agree is workable will do more good than a lot of regulation.

- *Where there are State, Federal, and local regulations, help farmers and ranchers understand and meet the requirements.* Through our conservation district partners, we are a link between private-sector agriculture and those who make water quality laws and regulations. We help landowners understand their responsibilities in controlling nonpoint source pollution, and we help regulators see agriculture as part of the solution, not as part of the problem.

- *Help nonagricultural people see the agricultural perspective,* to understand that much of agriculture is taking the initiative in water resource protection. That is not an easy task when you have the responsibility of feeding and clothing the other 98 percent of the people in this country and much of the rest of the world, all the while dealing with nature, consumer demand, and public sentiment — and trying to make a living at it!

The partnership effort does not stop with SCS and the conservation districts. Throughout the U.S. Department of Agriculture (USDA), water quality is a top conservation priority and the interagency teamwork is unprecedented. All USDA agencies involved in water resources, and many of our counterparts in other Federal and State agencies and in the private sector, are integrating their work in education and technical assistance, research, and database development. The goal of this partnership is to help American agriculture protect water resources without jeopardizing its economic efficiency.

Protecting water quality and quantity is everybody's business, and we must work in harmony with each other if we expect our business to succeed. And it will succeed — as a partnership, as a team! But, we need to get on with it now!



Water Quality

The Gulf of Mexico Program

An Update

YOU CAN'T TALK about the Gulf of Mexico without citing statistics: it touches five Southern States: Florida, Alabama, Mississippi, Louisiana, and Texas, with a coastline that stretches almost 1,700 miles. It's an exceptionally productive sea, annually yielding more than 2.5 billion pounds of fish and shellfish, representing about 40 percent of the total domestic, commercial fishery market.

The Gulf supports more than one-third of the marine recreational fishing activities, hosting 4 million fishermen who made 24.6 million fishing trips in 1985. About 45 percent of the country's shipping goes through Gulf ports, and 90 percent of the offshore oil and gas

comes from there. The Navy has proposed eight strategic homeporting sites along the Gulf Coast.

The coastal estuaries, wetlands, barrier islands, and mangroves provide important habitat for large populations of wildlife. This includes both migrating and nonmigrating waterfowl and shorebirds, and marine life, offering protection and nutrients to thousands of species. It has also become home to one-sixth of the human species of the United States.

In other words, the statistics, more than anything else, give the true magnitude of the Gulf's value. It may be one of the most important natural resources that the United States has.



The map illustrates the Gulf of Mexico Drainage Basin. The Mississippi River Basin alone makes up 41 percent of the entire drainage basin.

and Quantity

This large body of water that, for so many years, has been viewed as one of the least altered and most healthy and productive of the United States' coastal marine environments is beginning to show strain from environmental and societal pressures. These include algae growth and red tides with consequent fish kills on the beaches, volumes of trash collected daily along the shoreline, habitat destruction, coastal erosion, and shellfish bed closings caused by fecal coliform and toxic contamination. The toxic poisoning indicates contamination by industrial sources and the coliform, which can be of animal or human origin, may indicate inadequate treatment of human or animal waste.

Over 66 percent of the area of the contiguous United States drains into the Gulf (see map). While environmental conditions may be manifested in the Gulf States, many of them result from sources and activities that are regional and which may be far upstream from the sea.

Because the Gulf environment involves so many States, agencies, and organizations, a Gulf of Mexico Program (originally set up in 1986 as The Gulf Initiative) has been developed to provide a forum for defining and addressing environmental problems. It is designed to improve communication among participants and build coalitions to achieve more effective protection of valuable coastal resources.

The Gulf of Mexico Program includes representatives from all appropriate Federal agencies, Gulf States, academia, and all Gulf-user groups, such

as representatives from agriculture, the commercial and recreational fishing industries, developers, and citizen action groups.

The most important long-term goal of the Gulf of Mexico Program is to restore, maintain, and protect the Gulf environment. Included in this goal is protecting human health and sustaining living resources, taking action to further control pollution of the waters, and ensuring that alternative uses and economic growth are managed in an environmentally sound manner.

In April 1989, two short-term goals were identified in a "five-year strategy: 1988 — 1992" plan:

Goal 1: The establishment of an effective infrastructure for resolving complex environmental problems associated with human use of the Gulf of Mexico.

The objectives to reach this goal include the establishment and support for a Gulf of Mexico Program Office (set up at the John C. Stennis Space Center near Bay Saint Louis, Miss., in August 1988); the establishment and implementation of a committee structure to include a policy review board (SCS Chief Wilson Scaling is a member of this board); a technical steering committee and a citizens' advisory committee; and establishment of a public education network and outreach program.

Goal 2: The establishment of a framework-for-action for implementing management options for pollution controls, for remedial and restoration measures for environmental losses, and for research direction and environmental monitoring protocol.

The objectives under this goal include preparation of environmental characterizations; preparation of environmental assessments; development of an interactive data management system; development of predictive assessments; development and implementation of a Gulf of Mexico Environmental Management Plan; and development and implementation of a Gulf of Mexico Monitoring Plan.

"The environmental problems in the Gulf are bigger than any of us can handle alone," said L.P. "Pete" Heard, State conservationist in Mississippi. "You don't need a lot of research to know there's a problem. For example, shellfish have been excellent indicators of toxic and coliform pollution. They can be retrieved and levels of contamination measured all year around. When they start dying, the evidence indicates that something's wrong. To solve this problem, we've got to pull together, and that's why I think the Gulf of Mexico Program will be effective." Heard is an SCS representative and co-chair on the nutrient enrichment committee of the Program. He is also the only SCS representative on the technical steering committee.

The two short-term goals summarized above are expanded in a paper titled "The Gulf of Mexico Program, Five-Year Strategy: 1988-1992," which is available from the Gulf of Mexico Program Office, Stennis Space Center, Bay St. Louis, MS 39529.

Kathleen Diehl, contributing editor, *Soil and Water Conservation News*, SCS, Washington, D.C.

"Farmers . . . are going to need some hard evidence to convince them that their farm management practices may contribute to a problem 2,000 miles away."

SCS Is Represented In Gulf Program

THE GULF OF MEXICO Program is attracting support and active participation from many organizations and citizen groups. One of the Federal agencies involved is the United States Department of Agriculture (USDA) with representatives from both the Soil Conservation Service and the Forest Service.

Kenneth R. Blan represents SCS in the Gulf of Mexico Program. He was assigned to work with the Environmental Protection Agency (EPA) and his work relates to all areas where SCS and EPA interests coincide, with emphasis on control of nutrient enrichment. He also attends meetings and reports to USDA and SCS on progress made in the Gulf of Mexico Program.

Blan is a 30-year SCS employee and has experience at the local, area, State, and National Technical Center levels in the agency. He moved to the Gulf of Mexico Program at Bay Saint Louis, Miss., from Stillwater, Okla., where he was the State resource conservationist. He earned a B.S. degree in agricultural education from Oklahoma State, a masters degree in agronomy/range management from Kansas State, and a Doctor of Jurisprudence from Mississippi College School of Law.

Blan sees his job with the Gulf of Mexico Program as a continually developing one.

"My job is like the Gulf problem itself," he said. "It's fluid, constantly moving around, and it's long term. One of my first priorities is to try to determine what the agricultural contribution is to the environmental problems in the Gulf. Farmers are taking a lot of heat right now over their management of the water leaving their property. But, you can't blame the farmer for problems caused by the oil industry, or for municipal waste disposal, or careless

use of chemicals by suburban residents, or people who don't clean up after themselves with regard to personal waste and trash.

"Research is being collected now, and with time we'll have a better idea where most of the problems originate," Blan continued. "It'll be difficult, though, to get two-thirds of the United States to take ownership of the Gulf's problems. Let me give you an example. The beach at Gulfport, Miss., is one of



Kenneth R. Blan, SCS representative in the Gulf of Mexico Program, inspects water at Percy Quin Lake on the Tangipahoa River in Mississippi. (Photo by Kathleen Diehl.)

... when the subject turns to ... plants being used as a biological filtration system for removing waste ... people want to know more ... whether it will work on earth.

the most heavily used beaches in the Gulf. They had to shut it down at the end of last summer because it was determined to be unsafe for swimming because of fecal coliform contamination.

"An Iowa farmer has no interest whatsoever in the swimming problems in Gulfport. Farmers are going to need some hard evidence to convince them that their farm management practices may contribute to a problem 2,000 miles away. Midwest farm State representatives are primarily concerned with people in their own States, not those in the Gulf. They're going to need proof, too. Right now, everyone is aware, I think, there's a problem. But, not even the experts are sure of the extent of it."

Part of Blan's job is involved with the proposal and implementation of demonstration projects funded through the Gulf of Mexico Program in each of the five States that border the Gulf. All five States have agreed to set up pilot projects to gain needed public support. The demonstration projects Blan hopes to set up in Mississippi, for example, involve dairies installing a lagoon system plus an artificial wetland for the effluent wastewater.

The artificial wetlands will use some of the plants and techniques developed by the space station scientist, Dr. Billy Wolverton (see box). Blan wants to help identify farmers in Mississippi willing to set up their operations as pilot projects along the Tangipahoa River drainage area.

Space-Age Research Used On Farms

GROWING FRESH PLANTS in space is a subject that fascinates most people in the farm community. That it can be done is, in itself, a topic that can be talked about for hours. But when the subject turns to the plants being used as a biological filtration system for removing waste from the space capsule environment, many people want to know more about the concept and more about whether or not it will also work on earth.

Dr. Billy C. Wolverton, an environmentalist and senior scientist at the Science and Technology Laboratory at the John C. Stennis Space Center in

"I'm certain, because of Wolverton's research, we can demonstrate a reduced nutrient level in the effluent waste being filtered through an artificial — or a natural — wetland before it enters the stream. If we can do this in a cost-effective manner, we can greatly reduce the pollution making its way to the Gulf in a manner that will appeal to farmers because it will allow them to become part of the solution," Blan said.

Blan is enthusiastic about the Gulf of Mexico Program and feels it has made a tremendous start.

Bay Saint Louis, Miss., is one of the leading experts on using plants as filtration systems in space. On earth, he has initiated significant research that uses them in artificial wetlands for removing pollutants from wastewater.

Some of his projects have included: vascular, aquatic plants as biological filtration systems for removing domestic and industrial pollutants from wastewater; utilization of harvested plant material as renewable sources of feed, fertilizer, and methane; use of plants for purifying and revitalizing air inside energy-efficient homes and other closed facilities; and converting raw sewage to potable water.

For those interested in his techniques and/or research on artificial wetlands, plant environments, and waste and polluted water management, contact him at the John C. Stennis Space Center, Building 2423, Bay Saint Louis, MS 39529-6000.

"I was very impressed by the most recent citizen's advisory committee meeting. They were discussing a controversial issue and after vigorous discussion, some effective decisions had been made. I guess what impressed me more than anything, was their commitment to restore the Gulf. With that kind of commitment, I believe there's hope."

Kathleen Diehl, contributing editor, *Soil and Water Conservation News*, SCS, Washington, D.C.

The SCS dairy management systems' designs now set the standard for dairy management in Florida and possibly in other States. . . .

Dairy Industry Strives for Better Water Quality

IN FLORIDA, improving the water quality in Lake Okeechobee, the second largest inland fresh water lake in the United States, and aiding the commercial and recreational fishing industry in the lake became the driving force for the passage of the Department of Environmental Regulation Dairy Rule in 1987.

The SCS field staff in the Lake Okeechobee area had those same goals, but added two others: improving the water supply for much of the southern part of Florida, including the metropolitan area of Miami, and saving the dairy industry, which employs many people and provides milk for millions (see previous article in May 1988 issue of *Soil and Water Conservation News*).

A turnaround in the water quality of Lake Okeechobee has had some interesting benefits for SCS in Florida. First, some background information:

A Rural Clean Water Program was set up for the Taylor Creek-Nubbin

Slough drainage area north of Lake Okeechobee in Central Florida in 1981 after it was identified as a major source of phosphorus pollution. This involved 24 dairies, with an average herd size of 900 cows, in a voluntary program. The program was expanded in 1986 to include the Lower Kissimmee River.

In 1986, a large algae bloom covering 120 square miles of Lake Okeechobee put both the commercial fishing industry and the dairy industry (representing 25 percent of the entire Florida dairy industry) surrounding the lake in jeopardy. In 1987, because of State, Federal, local, citizen, and industry concern, the State of Florida passed the Department of Environmental Regulation (DER) Dairy Rule and appropriated \$8 million as cost-sharing money.

In order to meet the Dairy Rule requirements governing irrigation, runoff, and storage of waste, dairy operators were forced to make quick decisions. Even with cost-sharing, the cost of the best management practices averaged between \$100,000 and \$600,000 per dairy. Ten dairies agreed to sell under the State's \$4.3 million buyout plan rather than comply with the tougher pollution control laws.

The deadline for submission of management plans for the remaining 42 dairies was June 3, 1989. All dairies must have waste management systems installed by January 1, 1991. This is a challenge for both the dairy industry and SCS engineers.

SCS, with the aid of a water management computer model (DRAIN-MOD), designed dairy management

systems that would capture runoff from high-intensity dairy areas, encourage cattle to remain in those areas through better feed, water, and shade management, and use the animal nutrients on the farm in a pasture or cropping system. The designs balanced the amount of phosphorus produced in animal manure with the amount that can be used for crops.

By May 1989, four dairies had completed installation of best management practices, and another five installations are under construction and expected to be completed by fall 1989.

Initial water quality monitoring data being gathered on the completed dairies is showing a definite downward trend in phosphorus levels.

The SCS dairy management systems designs now set the standard for dairy management in Florida and possibly in other States facing similar requirements. Because of the design quality of the plans prepared by the Okeechobee field office, the State of Florida now accepts those plans in its cost-share program, virtually without question. The State Department of Environmental Regulation routinely seeks SCS expertise in dairy management systems, as well as in other engineering-related areas.

Lorin Boggs, district conservationist, SCS, Okeechobee, Fla., and **Virginia Hungerford**, assistant State conservationist for public affairs, SCS, Gainesville, Fla.

Rural Clean

Stewardship Emphasized In Puget Sound

PUGET SOUND, in the State of Washington, is ringed by towering, snow-covered peaks, forests, wilderness, and the Pacific Ocean. It was recently designated by the Environmental Protection Agency (EPA) as an Estuary of National Significance. Protecting the Sound from water quality degradation is vital to the people who live in the Pacific Northwest.

The Puget Sound Water Quality Authority (PSWQA) was established in 1985 to study the ecology of Puget Sound and recommend action that would improve and protect its waters. PSWQA enlisted the help of the Soil Conservation Service's Puget Sound Cooperative River Basin Team to assist lead agencies and watershed management committees in 12 Puget Sound counties in developing the Puget Sound Water Quality Management Plan.

The SCS Puget Sound Cooperative River Basin Team is comprised of people representing many different disciplines. Members from SCS include: Allen Zulauf, team leader; Terry Nelson, economist, and Linda Helm, cartographer. They are joined by John Perkins, a forester with the USDA Forest Service, and Barbara McIntosh, fishery biologist of the the Washington State Department of Fisheries. The team is housed with Washington State Department of Ecology and works directly with their specialists involved in the Puget Sound planning process. The Field Advisory Committee (FAC) that oversees the River Basin Study includes representatives of State and local governments, in addition to the U.S. Department of Agriculture.

The Team helps develop criteria for ranking watersheds and for identifying and evaluating nonpoint sources of

In Sequim Bay, on Puget Sound, many residents, mostly retired people, are involved in a program that emphasizes land stewardship in an effort to protect the Bay from pollution.



Water Program

pollution. The Team and PSWQA are focusing on county watershed management committees for developing individual watershed management plans.

For example, Sequim Bay was identified as one of the early action watersheds, giving it an extremely high priority for protection because of its beneficial values and the threat of possible pollution that would adversely impact on Puget Sound. Sequim Bay is used for commercial and sport shellfish harvesting, fishing, and marine boating.

The Sequim Bay Watershed is unlike other watersheds surrounding Puget Sound because it is an area being developed for retirees and recreation. Temperate and scenic, it is situated on the northern Olympic Peninsula of Puget Sound, a short ferry ride from Seattle. It is home to about 5,400 people, 47 percent of whom are over 55. Demographers estimate that the population will increase 42 percent by the year 2000.

To house the newcomers, local open space and agricultural land is being converted to residential development. Many of these homesites are 5 acres or less, and the owners often keep livestock on their property. The area is also served by more than 50 miles of open irrigation ditches that collect and transport nutrients, chemicals, household wastes, and urban runoff to Sequim Bay. Most of the new homes have on-site septic systems, which pose a potential threat for ground water pollution or contamination of surface waters.

Sediment and nutrients from runoff clog streams and deplete oxygen, thus destroying fish habitat. In addition, some surface water is used domestically for drinking, increasing the im-

portance of protecting water quality.

The presence of fecal coliform bacteria, an indicator of other harmful pathogens found in animal and human waste, has led State officials to close some shellfish beds in Puget Sound, though none in Sequim Bay. If toxicants and bacteria are present, they can become concentrated in the flesh of shellfish and pose a serious health risk to humans. Shellfish bed closure has a significant impact on local economies.

The River Basin Team working on Sequim Bay conducted stream walks and door-to-door surveys, interpreted aerial photography, and studied documents from the county assessor and other resource data in order to evaluate water quality and understand the economic and resource concerns. The information gathered has been evaluated and presented to Clallam County and the Sequim Bay Watershed Committee in the form of reports and maps. A "family of maps" was developed through the Geographic Information System (GIS) computer data base that provided a means to store, evaluate, and display resource information collected by the Team. The Team has entered into cooperative agreements with two State agencies in order to develop the GIS for use in sharing technology and information for watershed planning.

Allen Zulauf, a member of the River Basin Team, says one significant aspect of the Puget Sound planning process is the involvement of watershed management committees. Here, local residents are responsible for formulating and agreeing to solutions for water quality problems in their own watersheds. Stewardship of the land is emphasized. The River Basin Team's role is to provide these committees with the best technical information available to help

them understand the resource problems and to make sound decisions on preventing or controlling nonpoint water pollution.

L. Katherine Baril, water quality program manager for Clallam County, said, "The Team was pragmatic and offered assistance in the format we needed. Their reports were written in a manner that the lay person could understand and utilize. Everyone is relying on technical assistance and education like the kind SCS provides—particularly our local hobby farmers. These are the people who can really make a difference in protecting Sequim Bay from pollution."

PSWQA oversees a massive public education and information campaign. Information efforts are aimed toward teaching local residents how their actions affect the water flowing into Puget Sound, through such actions as the use of lawn and garden fertilizers and household chemicals, disposition of used oil, and maintenance of septic tanks. The campaign informs them of the many ways water quality affects the local economy and attempts to instill a sense of stewardship for the Sound.

Critical watershed identification is moving forward with the help of the PSWQA, the SCS Puget Sound River Basin Team, State and local governments, and private citizens. With the concerted efforts of these various agencies and individuals, the pristine purity of Sequim Bay and the Puget Sound can be protected. In a State whose residents treasure the environment, the future of Puget Sound holds great promise.

Jo Schilling, public affairs specialist, SCS, Albuquerque, N.M. (while detailed to SCS, Spokane, Wash.)

Many farmers have cut their fertilizer costs in half through better waste management systems.

Monitoring Water Quality In Vermont

WE'RE ABOUT a half mile from shore. To the east, Vermont's Green Mountains are rising through the morning mist. Silos of dairy farms stand like chess pieces at the water's edge. A gull glides by, but finds the three of us and our small boat full of scientific gear of no interest.

We're seeing the benefits to St. Albans Bay of the Rural Clean Water Program (RCWP). I've been shown numerous charts and graphs and reports and maps on everything from aquatic macrophytes to the number of visitors at a nearby State park. A fish playfully flips the surface and steals my thoughts.

St. Albans Bay covers nearly 3 square miles and opens to the southwest into Lake Champlain. It is fed by water flowing over 52 square miles, a watershed that includes two municipal sewage treatment plants and 102 dairy farms. Water from the watershed contains nutrients — particularly phosphorus — that have been blamed for extensive algae blooms and nuisance aquatic vegetation that, until recently, were choking the bay.

Over the past few years, the Environmental Protection Agency and the State of Vermont have upgraded the two sewage treatment plants, which originally accounted for nearly half of the phosphorus entering the bay. The Soil Conservation Service and the Agricultural Stabilization and Conservation Service meanwhile have been providing technical and financial assistance through the St. Albans Bay Rural Clean Water Project to help dairy farmers install best management practices (BMP's) to control the sediment and nutrients leaving their farms. To date, 61 of the farmers have implemented

BMP's on 76 percent of the critical areas.

Debra Lester finishes her work at the first station, starts the outboard motor, and plows the boat across the bay to a spot off the town beach of St. Albans. She begins to repeat the series of tests and sampling. Lester works for the University of Vermont Water Resources Research Center and has been doing this for more than 4 years, even in winter when the ice on the bay is so thick that people drive cars across it on the way to town.

There are four monitoring stations in the bay and six on tributaries that flow into the bay. Not all the tests have to be performed every week. There are great seasonal variations in runoff.

With us is Jim Monahan, SCS district conservationist at the St. Albans, Vt., field office. It is his office that has helped the farmers implement the BMP's. Monahan helps Lester hoist a heavy cylinder of water into the boat and fills plastic containers with water for later lab analyses. Lester describes the various tests, but my eyes settle on

Dairy farms in the St. Albans Bay watershed come down to the water's edge. (Photo by Paul Barker.)



"This is just a personal observation . . . there's a lot less plant life in the water now . . . you have to say the water is better."

a lone fisherman at the far end of the beach, casting a line into one of several brooks that enter the bay. I can't see if he's caught anything.

I want to know if the BMP's are improving water quality in the bay. Kathy Newbrough, a graduate student in biological sciences, has shown me laboratory slides left in the water at a control station — one where there are no BMP's upstream. "You can really see the algae on these slides," she said. "It's much greener than the slides I leave at the other stations."

Several dairy farmers have told me about their BMP's. They used to stack the manure in huge piles and lost much of its fertilizer value as rains washed it into the bay. Now they collect barnyard wastes in holding ponds and carefully schedule its application on fields where they grow corn or pasture.

One farmer with a new barnyard and storage pond, Paul Warde, pointed with pride to a brook that crosses his 250 acres and runs directly into the bay. "The brook looks much better now," Warde said, "and it ran all year last year — even through the drought." Many farmers have cut their fertilizer costs in half through better waste management systems.

I've also spoken to scientists at the University of Vermont, whose computers keep track of the bay water's turbidity, plant life, temperature, acidity, dissolved oxygen, phosphorus content, nitrogen content, suspended solids, fecal coliform, and other characteristics. By analyzing manure logs kept by the farmers, they also monitor what happens to the more than 100 pounds of wastes generated every day by each of the nearly 10,000 dairy cows in the watershed.

"The public wants easy answers and a quick fix," one of the scientists, Jack

Conservation award-winning farmer, Jerry Yates, who has a dairy farm near St. Albans, Vt., stands in front of his manure holding pond. (Photo by Paul Barker.)



Clausen, told me. "But in water quality there are no easy answers. The phosphorus level this past winter was the lowest it's been in the 8 years we've been monitoring. But this may be a fluke. We need to do more monitoring — particularly of individual fields and of ground water — before we can say for sure that BMP's are improving the water in the bay."

"One of the things we've noticed is a very large decline in the bacteria count," Clausen continued. "It's 25 percent of what it was, and we can show a strong relationship between the number of dairy cows under BMP's and the bacteria count."

Back in the boat, Lester lowers a turbidity disk and announces she can see it to a depth of 19 feet, which means the water is a little more clear than usual and that there haven't been any storms lately. "This is just a personal observation," she says, "but

there's a lot less plant life in the water now. And we know the amount of phosphorus has decreased, so you have to say the water is better."

"We still get algae blooms in the summer," Monahan adds, "but they're nothing like they used to be. Less blooming and obnoxious odor. In summer, the water used to smell so bad you couldn't get near it."

Tests finished, we start up and pull away from the beach for the next monitoring station. The grey clouds have descended and raindrops sting my forehead. I sniff the cool, clean air and think of the fisherman receding into the mist behind us. His presence helps answer my question.

Paul Barker, former associate editor, *Soil and Water Conservation News*, SCS, Washington, D.C.

... the Rock Creek experiment is working ... 185 farmers developed plans, signed water quality contracts, and agreed to install over 5,000 individual practices. ...

Rock Creek Is Born Again

A WILDLIFE HABITAT obituary for Rock Creek, Twin Falls County, was written in a 1971 issue of *Idaho Wildlife Review* by the Idaho Fish and Game Department. A caption below a photo of a handful of organic sludge from the stream read in part, "This ... indicates a 'dead' stream insofar as wildlife is concerned."

Today, fishing is again popular in Rock Creek, and it has been reported that 3- to 4-pound rainbow and brown trout are fairly typical catches. Word has it that someone recently caught a 10-pound brown! How did this transformation happen?

The rebirth of Rock Creek started soon after the obituary was published. After the Idaho Department of Health and Welfare's Division of Environmental Quality (DEQ) labeled Rock Creek as "a severely degraded stream with serious public health problems," industrial and food processing plants had to begin treating their wastes and eliminating most point source pollutants. This brought about a dramatic improvement in esthetics as well as less bacterial contamination and organic and nutrient loading in the stream.

By 1979, Rock Creek was no longer labeled a serious public health hazard. But, it was classified as the most severely agriculturally degraded stream in Idaho because it still carried high loads of sediment and agricultural pollutants.



Rock Creek before and after. These photos show Rock Creek flowing into the Snake River. In 1979 (top), sediment deposits were high enough to be visible from the air. In 1986 (bottom), they are greatly reduced because of cleanup efforts. The white building at left in the bottom photo shows part of the Shorrock Hydroelectric Plant.

Since the Rock Creek watershed sprawls across the boundaries of the Snake River and Twin Falls Soil Conservation Districts (SCD's), the districts decided to tackle the agricultural problems together. Districts, as local units of government responsible for soil and

water conservation work, operate on the premise that local people know more about local problems than anyone else.

Roy Jesser, former chairman of the Snake River SCD, was convinced that

“... credit goes to the farmers who became concerned about soil erosion and water quality and were willing to do something about it.”

farmers would participate in a water cleanup project if they had technical assistance on how to reduce the sediment leaving their farms. His feelings were based on the results of the District's irrigation return-flow study, conducted in 1976-79, showing sediment entering the Snake River had been reduced by 80 percent in just 2 years.

The Rock Creek project was a much bigger challenge, however. The Rock Creek watershed contained 290 farms (not 25) and 45,000 acres (instead of 3,300).

District and Soil Conservation Service staff spent a year meeting with farmers to talk about the pollution problem and to identify where the most critical problems existed. Farmers expressed interest in participating in a project, but pointed out they would probably need some financial help to implement sediment control practices.

In 1980, USDA selected Rock Creek as one of 13 pilot project areas across the Nation for funding under the new Rural Clean Water Program (RCWP). The intent of the RCWP was experimental: to see if farmers would voluntarily participate in water quality projects and to see if streams and lakes could be effectively cleaned up.

Without a doubt, the Rock Creek experiment is working. Between 1980 and 1986, 185 farmers developed plans, signed water quality contracts, and agreed to install over 5,000 individual practices on their farms.

The RCWP is administered by the USDA Agricultural Stabilization and Conservation Service and provides long-term financial assistance to farmers who install and maintain best management practices to control criti-

cal water quality problems. SCS provides technical assistance to farmers in developing water quality plans through the local SCD's. A local Rural Clean Water Coordinating Committee, representing agencies concerned with water quality, assures effective program coordination.

What were some of the best management practices used in the Rock Creek area? One of the most important was sediment ponds, designed by SCS technicians, that allowed irrigation tail water to slow down and let the sediment drop out. Most farmers were shocked when the large ponds became full of sediment after only two or three irrigations. They began looking immediately for ways to improve their irrigation systems and do a better job of managing the water to reduce sediment. However, sediment reduction was very expensive, and other cheaper practices were considered.

One of these was conservation tillage, leaving residue of the previous crop on the soil surface until new crops were planted. Farmers were using it extensively on dry cropland, but they were not convinced that leaving crop residues on the soil surface would make furrow irrigation possible.

The USDA Agricultural Research Service at Kimberly installed research plots to investigate the problem. They discovered not only that it was possible to furrow irrigate, but that water infiltrated much better. SCD's began to promote the use of conservation tillage in the project area, and helped to find farmers who were willing to participate in field-size demonstrations.

The demonstrations show that conservation tillage will reduce sediment by 80 percent and operational costs by 18 percent, while maintaining or improving crop yields. No-till will reduce

sediment by 95 percent and operational costs by 26 percent. Presently, more than 6,600 acres of conservation tillage has been planned or implemented.

DEQ has monitored the water quality of Rock Creek during the life of the project, and the agency is very pleased with the results, according to Bill Clark, former water quality analyst. The amount of sediment entering the Snake River from Rock Creek has been reduced by two-thirds between 1982 and 1986, Clark says. The biological monitoring of the creek has also shown improvement.

“Fish are probably one of the best indicators of the health of a stream,” Clark said.

Local residents are rediscovering Rock Creek as a favorite fishing stream. “Not a day goes by that people aren't fishing Rock Creek now,” said Darrell Heider, Twin Falls County parks supervisor. Heider has also observed the improvement in water quality. “The water clarity is much better now, even during the height of the irrigation season,” he said, observing that children tubing in the stream are becoming a common sight.

“The Rock Creek experiment has worked,” says Brian Olmstead, chairman of the Snake River SCD. “It's worked because of the good cooperation between local, State, and Federal agencies. But the credit goes to the farmers who became concerned about soil erosion and water quality and were willing to do something about it.”

Rich Yankey, district conservationist, SCS, Twin Falls, Idaho

Nonpoint Source Plan Pays Off

Delaware is moving ahead with its nonpoint source (NPS) management program. Approximately \$1.7 million has been allocated to the program from Federal and State funds.

The management plan features four demonstration projects covering a variety of NPS problems across the State. Delaware was one of the first States to have its program approved by the Environmental Protection Agency.

The State's conservation districts and the Delaware Department of Natural Resources and Environmental Control's (DNREC) Division of Soil and Water Conservation will take the lead in preparing and implementing a State NPS management program.

Since the program's inception it has generated a great deal of interest and mobilized considerable resources. The anticipated payoff is significant improvements in the quality of Delaware's water resources. Close cooperation among the DNREC's Division of Water Resources, the Delaware Department of Agriculture, the Cooperative Extension Service, the Soil Conservation Service, and others made the NPS program possible.

In Sussex County, a small watershed within the Nanticoke River Basin will be treated with plans and systems dealing with poultry waste. In addition, a technique to compost poultry carcasses has been developed by the Universities of Maryland and Delaware and will be used in the demonstration.

A second demonstration effort in Sussex County will focus on information and education.

The Murderkill River Watershed in Kent County has a demonstration plan which features erosion control for intensively farmed soils. Best manage-

ment practices will be used for the land applications of sludge. Additional work items will address resource management systems for farmsteads and other rural homes.

The Middle Run/Upper Pike Creek Demonstration Project is aimed at improving water quality and quantity through improvements in erosion and sediment controls at construction sites, encouraging better fertilizer and pesticide applications by homeowners, and correcting streambank erosion programs.

Michael Kolman, assistant State conservationist for Water Resources, SCS, Dover, Del.

1992 Is Clean Water Year

Nineteen hundred and ninety-two has been designated as "The Year of Clean Water" and October 1992 as "Clean Water Month," according to a joint resolution recently introduced in the U.S. Congress. America's Clean Water Foundation will commemorate the 20th anniversary of the Clean Water Act with a 3-year effort to clean up as well as rekindle interest in protecting and preserving water resources.

The observance will feature a series of special programs — such as cleanup campaigns, waterfront festivals, conferences, and policy forums — beginning in 1989 and culminating in October 1992.

Water Week Focuses on NPS

Water quality has become a big issue in New York State — for city and country dwellers alike. In an effort to help the

public understand nonpoint source (NPS) pollution, the Soil Conservation Service worked with the New York State Department of Environmental Conservation and over 25 other organizations to carry out "Water Week 1989," from May 1 through 7.

The purpose of the annual Water Week is to draw public attention to New York's water resources. This year, the theme was "Nonpoint Source Pollution." Water Week activities centered around an NPS information packet that was sent to 10,000 high schools, business organizations, local government agencies and officials, citizen action and environmental groups, news media, and others all over New York State.

The packet was made up of a number of materials on NPS that could be used long after Water Week was over including: fact sheets on New York's water resources; a reprint of a magazine article summarizing the problem in New York; a lesson plan for teachers; a directory that explains the role of the many agencies and organizations involved in preventing NPS pollution; a four-color poster; a brochure describing a slide/tape show on the subject in New York; and colorful stickers with the Water Week/NPS logo.

Karen Williamson, audiovisual production specialist, SCS, Albany, N.Y.

Three New SCS EPA Liaisons

Last year, eight Soil Conservation Service employees were detailed to the Environmental Protection Agency (EPA). Three more have been added to the list. The offices where they are stationed include the EPA national head-

quarters in Washington, D.C., and EPA regional offices in Colorado and Washington.

The liaisons' mission is to coordinate SCS activities with EPA water quality programs. They will advise on methods to address water quality and quantity issues. They will also assist EPA in the development and management of effective nonpoint source (NPS) pollution control efforts.

Some of their duties will include: assisting in the development of ways to reduce the environmental impact of agricultural NPS pollution, working with State and local agencies in the design of best management practices, coordinating information exchange, and compiling technical data.

Following are the names and addresses for the three new liaisons. For the previous listing see the May 1988 issue.

Lee H. Bridgman — (WH-556)
U.S. Environmental Protection Agency
National Headquarters
Office of Water
401 M Street, SW
Washington, DC 20460
(202) 382-5691 or FTS 382-5691

Daniel L. Merkel — (CO, UT, WY, SD, ND, MT)
U.S. Environmental Protection Agency
Region 8
999 18th Street, Suite 500
Denver, CO 80202-2405
(303) 293-1570 or FTS 564-1570

Gerald L. Montgomery — (AK, ID, OR, WA)
U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, WA 98104
(206) 399-2596 or FTS 399-2596

Agrichemicals and Groundwater Protection: Resources and Strategies for State and Local Management

By **the Freshwater Foundation**

Covering the full proceedings of the fall 1988 Agrichemicals and Groundwater Protection Conference, this publication covers practical information pertaining to resources and implementable model programs that are available for assisting States, local entities, and farmers in the use of agrichemicals while still maintaining the protection of ground water.

Agrichemicals and Groundwater: Perspectives and Solutions

By **the Freshwater Foundation**

This nontechnical overview of concerns and responses related to the use of agrichemicals and their potential for contaminating ground water includes a 32-page, illustrated *Journal of Freshwater*. It features over a dozen examples of initiatives, programs, philosophies, and tools which represent effective efforts to manage agrichemicals responsibly.

Both of these publications are available from the Freshwater Foundation, 2500 Shadywood Road, Box 90, Navarre, MN 55392, at the price of \$38.50 and \$11.95, respectively.

Fourth Biennial Report

By **the International Joint Commission**

In 1978, the Great Lakes Water Quality Agreement included wording requiring the International Joint Commission to make a full report to the governments of both the United States and Canada biennially. The Commission's purpose is to give an assessment of the State of the Great Lakes; to find out to what extent both countries are achieving the purpose of the 1978 agreement; and to maintain and restore the physical, chemical, and biological integrity of the waters of the Great Lakes Basin Ecosystem. The report discusses pertinent topics involving water quality, such as the impact of nitrates; the presence and quantity of persistent toxic substances in point source effluents; the issues of nonpoint pollution programs; the introduction of exotic species to the Great Lakes from the discharge of ballast water of ships; and radioactivity.

Softcover copies of the English and French versions of the *Fourth Biennial Report* and its *Executive Summary* are available from one of the IJC offices: 100 Metcalfe, 18th Floor, Ottawa, Ontario K1P 5M1; 2001 S Street NW, Washington, DC 20440; 100 Quellerie Avenue, Eighth Floor, Windsor, Ontario N9A 6T3; or P.O. Box 32869, Detroit, MI 48232-2869.

NEW IN PRINT is prepared by **Thomas J. Kergel**, editorial assistant, SCS, Washington, D.C.

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Conservation Calendar

October	3	Alfred M. Landon Lecture on Public Issues, Manhattan, Kans.
	3	Association for Advancement of Industrial Crops Meeting, Peoria, Ill.
	4-8	World Dairy Expo, Madison, Wis.
	11-13	International Agribusiness Forum, Bellevue, Wash.
	12-13	Practical Conference on Communication, Oak Ridge, Tenn.
	16	American Society of Agronomy Meeting, Washington, D.C.
	18	Institute of International Development and Education in Agriculture Meeting, Las Vegas, Nev.
	22-24	American Feed Industry Association Midwest Convention, Kansas City, Mo.
	22-25	Communication Officers of State Depts. of Agriculture Annual Meeting and Workshops, Atlantic City, N.J.
	29-Nov 1	Southern Agricultural Association Convention, Pine Mountain, Ga.
November	3-4	American Agricultural Law Association Annual Meeting & Educational Conference, San Francisco, Calif.
	9-11	62nd National Future Farmers of America Convention, Kansas City, Mo.
	9-11	National Association of Farm Broadcasters Annual Meeting, Kansas City, Mo.
	10	Nebraska Hall of Agricultural Achievement Award Ceremony, Lincoln, Nebr.
	10-12	American Society of Farm Managers & Rural Appraisers Annual Meeting, Savannah, Ga.
	12-15	1989 International Irrigation Exposition & Technical Conference, Anaheim, Calif.
	12-15	American Bankers Association National Agricultural Bankers Annual Conference, St. Louis, Mo.
	14-18	Natural Resources for the 21st Century Conference, Arlington, Va.
	28-30	66th Annual USDA Outlook Conference, Washington, D.C.
December	4	Tuskegee University's George Washington Carver Memorial Lecture, Tuskegee, Ala.
	5-7	National Farmers Organization National Convention, San Antonio, Tex.
	12	Agricultural Research Service Scientists Meeting/Entomological Society of America National Conference, San Antonio, Tex.
	12-15	American Society of Agricultural Engineers International Winter Meeting, New Orleans, La.